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Fruit and Vegetable Diseases On The Chicago Market in 1936

Supplement 101

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

FRUIT AND VEGETABLE DISEASES ON THE CHICAGO MARKET IN 1936

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During the year 1936, 70,077 [1] cars of fruits and vegetables were used in the Chicago area. In addition to this amount it is estimated that 5511 carloads were received by truck. Over 4,000 carloads of fruits and vegetables were trucked in from Michigan and Illinois, the remainder came chiefly from Wisconsin, Ohio, Tennessee, Missouri, and Indiana, although 17 came from Florida. Thorough inspections were made by the Bureau of Agricultural Economics of over 2,000 of these cars received by freight and express. Diagnoses of the diseases found were made by the writer or under his supervision, and in addition to the data thus collected notes were taken concerning the prevalence of diseases found during weekly trips on South Water Market. Obviously it is possible to see only a small fraction of the fruit and vegetable produce received. The percentage figures given in this report do not represent averages but are accurate percentages of decay found in certain lots of produce from definite localities during certain periods of the year.

The successful transporation of most fresh fruits and vegetables has become such a commonplace matter that few realize the tremendous importance of the developments in this great industry. It is taken for granted that one can go to the market at any time and buy anything he wishes. As a matter of fact, most fruits and vegetables can be obtained in the fresh state in the larger cities practically every month of the year. Even such fruits as strawberries and watermelons, that were once available for only a relatively short period each year, are now available in large quantities for six or eight months.

Most States contribute one or more products and some furnish over half of certain commodities marketed during a year. The following table shows the State of origin and the number of carloads of certain fruits and vegetables used in Chicago during 1936, and a comparison of these shipments with the total number of carloads of the commodity received from all regions.

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[1] Arrivals and unloads of fresh fruits and vegetables at Chicago. Annual Report calendar year 1936. A. B. Farlinger, Bureau of Agricultural Economics.

Product	Origin	Number of Carloads	Percent of Total Carloads Used in Chicago
Apples	Washington	2129	65
Beans	Florida	523	50
Cabbage	Texas	876	40
Carrots	California	1274	90
Grapefruit	Texas	841	44
	Florida	812	43
Lettuce	California	3225	72
Onions	Texas	644	25
Oranges	California	3954	68
	Florida	1552	26
Potatoes	Idaho	4391	27
Tomatoes	Texas	598	22
	California	463	17
	Florida	440	16
	Mexico	403	15
Strawberries	Louisiana	522	81
	Florida	104	16
Watermelons	Georgia	676	27
	Mississippi	624	25
	Missouri	530	21

From this table it will be seen that fruits and vegetables travel great distances even to such centrally located cities as Chicago. Excluding local produce hauled by truck, approximately 22 percent of the fresh fruits and vegetables received on the Chicago market travels 500 miles; 25 percent, 1,000 miles; 10 percent, 1,500 miles; 33 percent, 2,000 miles; and 10 percent (mostly bananas), 2,500 miles or more. The products used in making a relatively simple fruit or vegetable salad have sometimes traveled more than 5,000 miles before they reach our table.

Considering the fact that so much of our fresh fruit and vegetable produce does travel such great distances it is remarkable that so little is lost on account of disease. Transportation test shipments and storage experiments by the Department of Agriculture have done much to demonstrate better methods of precooling and refrigeration to control the development of diseases and to preserve the fresh condition of highly perishable products, but there still remains much to be done along this line. The larger producers, Growers' Associations, and Refrigerator Express Companies appreciate this fact and cooperate heartily in the development of better transportation methods. This accounts for the excellent carrying quality of many of our important products. It is usually the small grower still operating on the theory that "there is a lot of good eating in that spotted apple" who attempts to ship poorly graded products showing evident decay at loading time. The federal-state shipping point inspection service and the federal inspection service at the larger receiving markets are our most effective agencies in demonstrating the necessity for better grading and packing of fruit and vegetable produce in order that the best market values may be obtained.

APPLES:

The storage and market diseases of apples induced by fungi are often relatively unimportant as orchard troubles. Blue mold (Penicillium expansum) is an outstanding example of this type of fungus disease. Each year the several varieties of storage apples, Delicious, Rome Beauty, Winesap, and Jonathans, usually show more decay by this fungus than by all the other apple pathogens combined. The highest percentage of decay noted in apples this year was in a load of Oregon Romes marketed in February. The decay in this instance was blue mold rot, ranging from 10 to 50 percent, averaging 30 percent for the load. Blue mold rot also occurred in several lots of Washington Delicious apples marketed during February, March, and April. Many lots showed 4 to 30 percent, the average in most instances being near 10 percent. Blue mold and gray mold (Botrytis spp.) were associated in some lots of Illinois Golden Delicious apples marketed in May.

A few Illinois Grimes' Golden apples received in March showed fish-eye rot (Corticium centrifugum).

Injuries associated with the various washing processes caused considerable damage to some lots of apples. From 20 to 75 percent of the apples in some boxes of Washington Delicious stock showed brownish discolorations of the skin characteristic of injury by excessively hot washing solutions. Heat injury of a different type also due to hot washing solutions affected 25 percent of some Colorado apples. This injury is characterized by shriveling and numerous small checks and cracks in the skin, generally towards the calyx end of the fruit. Some Idaho Jonathans showed a small percentage of acid bleaching and arsenical burn, but the stock observed here, as a whole, showed relatively little of this injury as compared with 1935.

Although internal breakdown was observed in many lots, this trouble was generally not of great significance. Some cars showed breakdown ranging from 2 to 5 percent, and one car of Washington Jonathans received in February showed 20 percent of this injury.

Most serious scald (30 percent) was found in a few lots of Michigan and Illinois stock.

Soggy breakdown occurred in 15 percent of some Michigan Golden Delicious apples received in December.

York skin-crack injured about 14 percent of the York apples received from Maryland in December.

ARTICHOKES:

The only decay of any consequence on the Globe artichoke is gray mold rot (Botrytis spp.). The stock arriving on this market showed very little decay of this type. Some lots occasionally showed from 1 to 3 percent.

ASPARAGUS:

Most car lots of asparagus are received from California during the months of March and April. The only decays noticed were bacterial soft rot (Bacillus spp.), affecting the butts of the spears, and fusarium rot (Fusarium spp.), affecting the tips. Neither of these decays was serious, the percentage of infected stock being generally less than 5 percent.

BANANAS:

Practically all bananas that are ripe enough for the retail trade show some anthracnose (Colletotrichum musarum). The skin discoloration and the slight decay produced is usually of no great importance; however, in some bunches anthracnose causes serious decay of the fruit at the point of attachment to the stem.

The most serious marketing factors are bruises and discolorations due to rough handling. Occasionally some stock is also discolored by ammonia fumes in the ripening and storage rooms. One lot of bananas inspected in the ripening room showed 75 percent of the stock seriously discolored by ammonia fumes.

BEANS:

Watery soft rot (Sclerotinia sclerotiorum) caused the most serious decay of beans during the year. A car of New Jersey beans showed this decay ranging from 2 to 25 percent, the average being 18 percent. Much of this stock was badly nested. Florida and Louisiana beans showed anthracnose (Colletotrichum lindemuthianum) ranging from 2 to 12 percent, but the average was usually about 3 percent for most lots. Bacterial blight (Bacterium phaseoli) occurred in California and Florida stock to a slight extent.

Russeting (physiological) is often one of the most serious marketing factors of green and wax beans. This discoloration was serious enough in some lots of Florida beans to cause a depreciation of 25 percent in their market value.

BROCCOLI:

There was no serious decay observed in the broccoli arriving on this market. Yellowing and spreading of the flower heads due to over-maturity was one of the most important marketing factors.

CABBAGE:

Bacterial soft rot caused by far the most decay in cabbages on the market. This decay usually shows up at the stump and involves one to three outer leaves of the heads. This disease is especially serious in young cabbage which is subjected to bruising. Decay of this type sometimes ranged to as high as 45 percent, but in most instances the average was near 12 percent.

A few lots of cabbage from various regions showed some alternaria leaf spot (Alternaria brassicae), but in most instances this blemish was not of much significance.

CARROTS:

The carrots received on the market this year often showed an unusually high percentage of watery soft rot (Sclerotinia sclerotiorum). This is especially true of California stock received during the last of August and the first of September. Some cars at this time showed a range of from 15 to 50 percent of watery soft rot, the average being 30 percent. Some lots of California carrots marketed in August also showed as high as 75 percent of bacterial soft rot in the tops.

One lot of California carrots received in June showed an unusual type of blemish of the root. This blemish appeared similar to scab at the point of emergence of the secondary roots, but in many instances there was a slight decay in evidence. All fungi isolated from this tissue proved to be species of _Fusarium_.

CAULIFLOWER:

About the only disease of importance in cauliflower was bacterial soft rot. This decay is present in the stock from most regions, especially where there is evidence of rough handling. Decay of this type often ranges between 5 and 15 percent. Gray mold rot and black mold rot (_Alternaria_ spp.) were noted in some Oregon stock received in October.

CELERY:

Most of the celery received on this market comes from Florida and California. The stock from each of these states showed an unusually high percentage of watery soft rot (_Sclerotinia sclerotiorum_). In the Florida celery received during April and May watery soft rot affected 80 percent of the stock in some cars.

Bacterial soft rot also caused serious decay in some Florida cars. One car in particular had an average of 60 percent infected branches showing early stages of decay. As is usual, the celery from most regions showed some infection by early blight (_Cercospora apii_) and late blight (_Septoria_ spp.), but in most instances these diseases did not seriously affect the marketability of the celery.

Black heart (physiological) was found in both the California and Florida stock, sometimes ranging to as high as 5 percent.

CHICORY:

Bacterial soft rot is the most common market disease of chicory. This disease is prominent in badly bruised stock and also follows in brownish discolored areas in the leaf margins of the heart region. Some lots of chicory from Arizona and California showed as high as 30 to 40 percent of the heart leaves with these brownish discolored margins and tips. The early stages of this discoloration appear to be due to physiological causes rather than to bacterial infection.

CORN:

The ear-worm is still the most serious marketing factor in green corn. Occasionally some bacterial soft rot follows in this injured tissue, but the disease itself is seldom of any consequence.

CUCUMBER:

Bacterial spot (*Bacterium lachrymans*) caused especially heavy losses in Florida stock marketed during the last of April and the first half of May. Fifty percent of the fruits in some cars were affected. Frequently these infected areas are not large and do not develop serious decay, but in a great number of instances it appears that the common bacterial soft rot organism also invades these regions and the combined bacteria induce a rapidly advancing decay.

Much of the stock received from Cuba showed 5 to 10 percent of bacterial spot followed by bacterial soft rot.

The most serious marketing factors were the shriveled ends and discolorations which sometimes affected more than half of the stock. Generally speaking, the spongy and shriveled ends and discolorations cause a greater market depreciation than any of the diseases.

Cottony leak (*Pythium* spp.) was found affecting 2 percent of the cucumbers received from South Carolina in June.

EGGPLANT:

A great many of the eggplant shipments from Cuba as well as from Florida showed high percentages of fruit rot (*Phomopsis vexans*). This decay develops very rapidly during transit, and it is not unusual to find many spots 2 to 3 inches in diameter by the time the stock is received on the market. One lot of Cuban stock received in February showed from 10 to 25 percent of *Phomopsis* fruit rot.

GARLIC:

The only decay of importance in garlic was blue mold (*Penicillium* spp.). In one car received from California in November this decay ranged to as high as 17 percent.

GRAPES:

The most serious decay of California grapes is induced by gray mold and by blue mold. The blue mold rot is especially serious in stock that shows split or crushed berries. Gray mold rot sometimes causes serious loss during transit and marketing, but it is also a very serious decay which develops in storage stock.

GRAPEFRUIT:

Most of the grapefruit received on this market come from Texas and Florida. The stock from each of these States showed some stem-end rot (Phomopsis and Diplodia), the usual range of infection being 1 to 5 percent, but in some instances ranging as high as 18 percent with an average of 10 percent. Blue mold rot (Penicillium italicum) was found in small percentages in many lots.

Pox and other physiological blemishes of the skin frequently cause greater reduction in the market value of the shipments than the fungous diseases.

LEMON:

Green mold rot (Penicillium digitatum) was the only parasitic disease of lemons noted. In many lots this rot occurred in from 1 to 10 percent of the stock, the average being about 5 percent. One lot of lemons marketed in October showed an appreciable percentage of albedo browning.

LETTUCE:

Bacterial soft rot is by far the most serious market and transit disease of lettuce. This product from all localities shows some of this decay, and, in some instances, practically 100 percent of the heads may show infection. For example, a car of Washington lettuce received in June showed from 60 to 95 percent (average 80 percent) of the heads having from two to eight outer leaves infected. Many cars of stock from California showed a range of from 1 to 40 percent decay, the average often being about 25 percent. In most all instances the decay is confined to one to three outer leaves. These leaves may be trimmed off and heads marketed immediately without serious loss. However, if badly affected stock is not trimmed and sold soon after it is taken out of the refrigerator, serious decay develops throughout the heads and great losses are sustained.

The most serious blemish of lettuce, tip-burn, frequently offers an opening for bacterial infections. In numerous instances it is found that a high percentage of bacterial soft rot is associated with a high percentage of tip-burn.

In occasional cars a blemish known as ice-burn was noted. This trouble is brought about by packing finely crushed under-cooled ice in the packages.

OLIVES:

There are not many fresh green olives shipped to this market but occasionally a carload is received. No decay of any consequence has been observed in this stock, but in green olives that have been held in cold storage a serious internal browning has been noted. One lot of California olives received in October showed over 50 percent of the stock with internal discoloration. The surface tissues of this fruit appear green and normal in every respect during the early stages of the development of the internal browning. In the final stages, the surface tissue also becomes brown and in a few instances this broken down tissue had become affected with alternaria rot (Alternaria spp.).

ONIONS:

Gray mold rot was present to some extent in practically all storage lots of onions. A number of inspections showed this disease present in 1 to 15 percent of Colorado, Idaho, California, Texas, Louisiana, and Michigan stock. The most serious decay noted was in a lot of Minnesota onions marketed in April which had an average of 30 percent gray mold rot. A lot of Texas onions received in May showed a range of from 3 to 45 percent, with an average of 17 percent gray mold rot.

Bacterial soft rot affected 12 percent of some California onions that showed sun-scald. One car of Texas onions shipped in July showed black mold rot (Aspergillus niger) and rhizopus rot ranging from 12 to 75 percent, with an average of 35 percent. These decays are frequently serious in stock that is not well cured or that has become moist and warm during transit. Louisiana onions received in May showed a very high percentage of decay in which Macrosporium, Fusarium, and bacteria were associated. In two car-lots examined, the range of decay was from 18 to 50 percent, the average being 35 percent.

Storage breakdown was found in two lots of onions; one from Michigan had 10 percent and one from Minnesota had 20 percent of this type of injury. Both of these lots showing storage breakdown also showed gray mold rot.

ORANGES:

The ubiquitous blue mold (Penicillium italicum) caused some damage to oranges from all regions, the average percentage of decay in most cars, however, being not more than 5 percent. The greatest amount of blue mold found in any one car was in a shipment of Florida stock received in January that showed a range of decay of from 10 to 55 percent, averaging 30 percent for the load.

Stem-end rot (Phomopsis and Diplodia) was present in small amounts (2 to 4 percent) in Florida stock, and in an occasional car the decay ranged from 10 to 15 percent.

Several lots of Florida oranges showed 5 to 15 percent with brown to brownish-red discolored sunken areas and spots, usually near the stem-end, which appeared to be associated with the "color added" process.

A few cars of California stock showed a small percentage of anthracnose stem-end rot (Colletotrichum gloeosporioides).

PEACHES:

As usual, brown rot (Sclerotinia fructicola) and rhizopus rot (Rhizopus spp.) caused most damage to peaches received on the market. Georgia, Tennessee, and Illinois stock showed an average of about 5 percent brown rot in many cars. In most cars rhizopus rot caused fully as much damage as the brown rot.

A car of Washington Elbertas received in October showed 50 percent internal breakdown characteristic of cold storage injury.

PEARS:

Gray mold rot was found in a few lots of Oregon Anjou pears marketed in April. The greatest decay noted was in a car showing a range of 1 to 8 percent, with an average of 2 percent. One box in this lot showed 25 percent of gray mold rot.

A bulk car of Indiana Kieffers received in November had 8 percent of blue mold and of black rot (Physalospora obtusa).

The most interesting decay noted during the year was Sporotrichum rot in the Medford, Oregon Anjou pears marketed in February. Up to 40 percent in some boxes showed dark brown to black, circular depressed spots one-fourth to one and one-fourth inches in diameter. The affected internal tissues were yellow-brown to dark-brown and soft to spongy in texture, depending on the size of the lesion. The spots ranged in depth from one-fourth to one-half inch. At room temperature many of these spots were observed to increase in diameter at the rate of one millimeter per day.

PEAS:

Defects such as over-maturity, poorly filled pods, and scars caused greater depreciation in the market value of green peas than any disease. In a great number of cars these defects ranged from 10 to 40 percent. In recent years the *Cladosporium* scab and distortion of pods due to mosaic infections also contributed largely to the bad appearance of many lots.

Bacterial soft rot was found in occasional lots affecting 2 to 5 percent of the stock. Gray mold rot was observed in a few lots of California peas marketed in May.

PEPPERS:

Rhizopus rot is usually the most common decay of peppers during transit. This disease affected 3 to 7 percent of many lots this year.

Gray mold rot occurs also in transit, but it is most serious in storage peppers. Some lots of California peppers that had been in cold storage showed 90 to 100 percent infection, over half of which was gray mold, the remainder being *Cladosporium* and *Alternaria*. Some Texas peppers marketed in November also showed practically 100 percent infection, mostly by *Alternaria* and *Cladosporium* but some *Botrytis* was also present. These three organisms seem to be ever-present in stock held for any length of time in cold storage. A few lots of Texas and Florida stock showed small percentages of bacterial spot (*Bacterium vesicatorium*). These scab-like blemishes are not of serious consequence unless they are so numerous as to injure the appearance of the stock.

PINEAPPLES:

Black rot (*Thielaviopsis paradoxa*) was noted in a few carlots of Cuban stock.

A brown rot caused by a species of *Fusarium* was found causing 5 to 10 percent loss in pineapples from Puerto Rico and Cuba. Brown, slightly sunken spots at the "eyes" near the base of the fruits are characteristic of this disease. The affected areas are brown and usually about one-half inch in diameter and one-half to three-fourths of an inch deep. In advanced stages the brown tissues may become spongy and cavities may form which become lined with the mycelium of the fungus. Blue mold rot and some bacteria are frequently associated in some of these spots.

PLUMS AND PRUNES:

The only disease of importance in the plums and prunes was blue mold rot. This disease was found affecting 10 percent of one large lot of Michigan stock received in September and a car-lot of Idaho stock received in October.

POTATOES:

Bacterial soft rot and the various types of fusarium decays caused the most serious losses of potatoes during the year. The new stock from Florida, Alabama, and Louisiana received during the winter and spring suffered very heavy losses from bacterial soft rot. Several cars showing no apparent sun-scald had an average of 25 percent infection, and some car-lots showing definite sun-scald showed an average of 40 percent infection and a range as high as 80 percent. New Jersey potatoes received in August also showed high percentages of bacterial soft rot. Several cars showed from 5 to 10 percent infection, and in one particular car the range was from 5 to 75 percent, an average of 50 percent of the tubers showing bacterial soft rot. Some New Jersey potatoes also showed 5 to 10 percent of scab (Actinomyces scabies).

A number of car-lots of Idaho Russet Burbank potatoes examined in January and February showed 2 to 30 percent decay at the stem-end. Much of this decay was of the jelly-end type in which Fusarium was the predominant organism, although occasionally Rhizoctonia and some bacteria were present in the more moist lesions.

Fusarium dry-rots (Fusarium spp.) were common in storage potatoes from all regions. However, most well-graded stock from Colorado, Idaho, Minnesota, Arizona, and Michigan usually had less than 5 percent of this trouble.

As usual, one of the important marketing factors of potatoes was injuries due to rough handling. Defects ranging to 10 or 15 percent due to mechanical injury were not uncommon. Minnesota, Wisconsin, and North Dakota potatoes showed hollow-heart sometimes ranging to as high as 25 percent in some lots.

For the first time in recent years, leak (Pythium spp.) showed up in appreciable amounts in California potatoes received during June and July. In a few cars this decay ranged from 2 to 20 percent, average 8 percent. Leak also was observed in a few Idaho potatoes to the extent of 7 percent when marketed in August.

Fumigation injury due to carbon-bisulphide was serious in a few cars of California potatoes inspected in June. This injury is characterized by brown discolorations in the vascular ring and in the pith region of the tuber. In some potatoes the affected tissues separate and form cavities one-eighth to one-fourth inch wide.

RADISHES:

Bacterial soft rot of the tops was the only disease of market importance affecting bunch radishes.

RHUBARB:

A few lots of Washington and California rhubarb showed high percentages of gray mold rot. For example, one car of Washington stock showed a range of 10 to 70 percent, average 40 percent, and one car of California rhubarb showed an average of 75 percent of gray mold rot affecting one to one and one-half inches of the bases of the stalks.

RUTABAGAS AND TURNIPS:

A large amount of the Canadian rutabagas received this year were protected by a wax or paraffin coating. Most of this stock arrived in good condition as far as decay was concerned. A slight amount of gray mold rot was noted in occasional lots. The Minnesota rutabagas showed some fusarium decay and, in stock showing mechanical injuries, frequently bacterial soft rot was also present.

Downy mildew (Peronospora parasitica) was found in one lot of topped turnips received in February from Brownsville, Texas. Externally the roots looked normal, but, on cutting, grayish to brownish-black discolorations involved practically the whole interior of the root. The characteristic haustoria of this organism were abundant within the affected tissues.

SPINACH:

Bacterial soft rot caused practically all of the serious decay noted in spinach from all shipping regions. Frequently there was only a trace of this trouble, but in many cars the decay ranged to as high as 30 percent, often showing an average of about 15 percent. The chief other marketing factor was yellowish discoloration of the leaves, partially due to age, wind-whipping, and insect injuries. As usual, a great deal of the stock showed some yellowish discoloration due to downy mildew (Peronospora effusa).

SQUASH:

Only one lot of squash showed any decay of interest. This lot, of the Marblehead type from Washington, was received in the middle of January, and at that time it showed numerous brown to black, circular depressed spots, one-fourth to one and one-fourth inches in diameter, which penetrated one-fourth to one inch deep. The decay was spongy, tan to grayish-black and sharply separated from the healthy tissue. Cultures showed most of this decay to be alternaria rot (Alternaria spp.), but in some lesions blue mold rot was associated. This lot was of particular interest because it was allowed to remain in the car on the track until the end of January, and then an inspection was requested for a dumping certificate. On this inspection all fruit showed heavy alternaria decay, some rhizopus rot and some blue mold rot. Four thousand pounds of this stock were dumped on account of these diseases.

STRAWBERRIES:

As usual, many lots of strawberries showed some infection and decay by rhizopus rot, particularly in the top of loads that had not been properly precooled and where the temperature frequently gets high enough to allow development of this organism. Gray mold rot and leather rot (Phytophthora spp.) caused approximately 10 percent decay in some cars of Tennessee berries.

SWEET POTATOES:

Practically every car examined on this market showed some rhizopus rot. The decay varied in different lots from 1 to 70 percent. Many lots showed an average of 10 percent rhizopus rot and occasionally a car would show as much as 25 percent loss on account of this decay.

No other diseases of serious consequence were noted.

TOMATOES:

Phoma rot (Phoma destructiva) caused serious losses in tomatoes from Florida, Cuba, and Mexico. On inspection many cars showed 2 to 25 percent phoma rot on arrival, and when the green stock was held in ripening rooms sometimes over 50 percent loss was sustained before the fruits were ripe enough to market. For example, some Cuban tomatoes examined in the ripening rooms showed a range in decay of from 10 to 90 percent, with an average of 60 percent. Most of this decay was due to Phoma, but some Alternaria and Rhizopus were also present. In a lot of Florida tomatoes inspected in the ripening rooms 8 to 80 percent of the stock was affected with phoma rot in various stages of development. The average decay for the lot was 45 percent. Practically all infections occurred at the stem scar and in small cracks and mechanical injuries about the shoulders of the fruit.

Florida tomatoes received in January and February frequently showed alternaria rot about the stem-end of the fruits. Many lots had 5 to 10 percent of this decay and one car noted showed 8 to 35 percent with an average of 22 percent.

Rhizopus rot occurred in much of the Mexican stock received during February, March, and April. One car examined had up to 40 percent rhizopus rot in some lugs, the average for the load being 20 percent. The Mexican tomatoes received in December frequently showed as much as 30 percent loss due to green mold rot (Cladosporium spp.) and an associated alternaria rot. These diseases were particularly destructive in car-lots that were allowed to stand on track for ripening.

Bacterial soft rot was present to some extent in tomatoes from all regions but it was especially destructive in Texas tomatoes received during May and June. In some cars 50 percent infection was noted and in many the average decay for the load was near 20 percent. Some rhizopus rot and soil rot (Rhizoctonia spp.) and buck-eye rot (Phytophthora terrestris) were also present in Texas tomatoes.

California tomatoes shipped in November were often severely affected with alternaria rot at the stem scar and in mechanical injuries. Many lots showed 10 to 15 percent infection and in some stock practically every fruit was affected. One car in particular showed 40 to 100 percent alternaria rot in various stages, the average for the car being 60 percent. Most infections were in the early stages at the edge of the stem scar and in small injuries and cracks over the shoulders of the fruits. These blemishes and decays greatly reduce the marketability of such stock but do not entirely destroy its value.

Late blight rot (Phytophthora infestans) affected 5 to 25 percent of the tomatoes in many cars of California stock received in November. The greatest decay noted occurred in one car which showed up to 80 percent infection, the average for the load being 50 percent.

California tomatoes also showed some losses due to green mold rot (Cladosporium spp.). This decay was most common in the late fall crop that was harvested just previous to and following light frosts. Virus mottling of the streak and spotted-wilt types was prominent in several lots of California tomatoes in October. Some of these brown loop and circle blemishes continued to become more prominent in stock held on the market. Some green tomatoes that showed only faint traces of mottling when received developed conspicuous loops and circles in three or four days.

Bacterial speck (Bacterium punctulans) was found causing minor blemishes in a few California tomatoes received in October.

WATERMELONS:

Discolorations and blemishes due to bruising were the most important marketing factors for watermelons during the current year. Some carlots inspected showed as much as 30 percent of the stock badly bruised and discolored. Many melons showed bruised and softened ends and in this injured tissue frequently bacterial soft rot caused serious decay. One lot of Florida melons received in June showed 2 percent stem-end rot (*Diplodia* spp.). Anthracnose (*Colletotrichum lagenarium*) was not of much importance except in a lot or two of Missouri stock received in August. Hail injury affected 30 percent of a car-lot of Georgia melons received in July. Internal browning (physiological) of the rind was noted in a lot of Cuban Queen melons received from Missouri in August.